

Learning Outcome	Assessment Procedure(s)	Results of Assessment	Action Plans	Observations
<p>Demonstrate understanding of and literacy in the content and principles of a scientific discipline.</p>	<p>--Students take four exams, each having objective components that assess familiarity with terms and principles, and written components that assess the ability to explain principles. --Students complete weekly homework assignments that assess understanding of terms and principles.</p>	<p>--On exam 1, 83% of students scored 70% or better. --On exam 2, 83% of students scored 70% or better. --On exam 3, 100% of students scored 70% or better. --On exam 4, 91% of students scored 70% or better. --On homework, 96% of students adequately completed 90% or more of assignments.</p>	<p>--Scores on the objective parts of the exams tended to be much lower than scores on the written components. In the future, weekly quizzes will be given on Blackboard to help familiarize students with taking objective science exams and to encourage them to spread their studying more evenly across the semester, which improves retention.</p>	<p>--A very noticeable disparity existed between performance on objective and written components of exams, with students doing much better on written portions. The course is primarily for students not majoring in the sciences, who have more practice writing than taking objective exams. This suggests that writing might be an important element of assessment for these students, and that the course should help develop students' ability to answer objective questions.</p>

Learning Outcome	Assessment Procedure(s)	Results of Assessment	Action Plans	Observations
Perform laboratory or field procedures that explore the content and principles of these disciplines.	--Students do laboratory exercises that require proficiency with equipment, laboratory techniques, and scientific methods to complete successfully.	--All students successfully completed 70% or more of lab exercises involving technical expertise, and 87% successfully completed 90% or more of these exercises.	--In the future, more sophisticated experiments will be integrated into the laboratory part of the course, and students will be given skills tests in which they are asked to demonstrate specific techniques.	--Some students commented that some of the laboratory exercises were simple.

Learning Outcome	Assessment Procedure(s)	Results of Assessment	Action Plans	Observations
<p>Carry out scientific procedures in a socially responsible manner.</p>	<p>--Students read and discuss papers on topics such as stem cell research, the use of animals in biomedical research, the lack of regulation and ineffectiveness of many anti-aging remedies, social responsibility in addressing the health care needs of older adults and dealing with normal physical and physiological changes associated with aging, and general social responsibility in dealing with groups with special needs. On the written parts of exams and in laboratory assignments, students reflect upon, assess, and discuss these topics.</p>	<p>--All students were able to write thoughtful, reflective treatises on these topics, incorporating biological, medical, social, and ethical elements of the topics into their writing.</p>	<p>--Reading and discussion of topics such as these will continue to be integrated into lectures and laboratory assignments.</p>	<p>--Student feedback indicates that many students like being asked to make connections between general classroom material and real-world issues.</p>

Learning Outcome	Assessment Procedure(s)	Results of Assessment	Action Plans	Observations
Accurately observe, record, analyze, and report data collected in the scientific laboratory or the field.	--In four lab sessions, students conduct laboratory or clinical experiments that involve collecting data to evaluate hypotheses, and prepare scientific reports in which they present and analyze their data and discuss it in the context of the hypotheses being tested.	--On the first report, 100% of students scored 70% or better. --On the second report, 100% of students scored 70% or better. --On the third report, 96% of students scored 70% or better. --On the fourth report, 74% of students scored 70% or better.	In the future, students will be allowed to re-submit reports after revising them. Time will be set aside in lab to evaluate general ways that lab reports can be improved by revising them, prior to the due date for submission of re-writes.	Students generally demonstrated an ability to conduct scientific research in their reports, but repeatedly made many mistakes in scientifically formatting the reports.

ADDITIONAL EVIDENCE THAT THE GENERAL CORE LEARNING OUTCOMES ARE BEING MET:

Students routinely asked questions that reflected a basic understanding of the material and a curiosity about how the material was related to other topics and contexts.

EVIDENCE THAT COURSE SUPPORTED THE MISSION OF THE UNIVERSITY (Offer the “*...knowledge and skills needed to succeed as persons and professionals, and the values and sensitivity necessary to be men and women for others*”):

Discussion of ethical and social issues was lively, and students were able to articulate their opinions and explain the rationale for their beliefs. In addition, I received the two e-mail messages below from students, which indicate that they will use knowledge and skills obtained in the class in making informed decisions throughout their lives, and will themselves use what they have learned to educate others.

I had a great semester and learned a lot. I've been educating my father who is 70 years old about the biological complications due to aging that we've discussed in class. I learned how to better take care of my body and live a healthier lifestyle.

Thanks for such a wonderful semester. I'm not a HUGE science person but I really enjoyed the class and feel that I left with a plethora of knowledge that I can use for life.

**Core Assessment Matrix (CAM)
TEMPLATE**

UNIVERSITY OF SAN FRANCISCO

Core Area: Science

Spring 2007

(1) Student Learning Outcomes	(2) Measurement of Evidence	(3) Summary Results	(4) Assessment Informed Improvements
Demonstrate understanding of and literacy in the content and principles of a scientific discipline.	Homeworks, labs, exams, in-class group problem solving, in-class discussion	11 A's 17 B's 5 C's 2 D's 1 F	NA - this assessment sheet has not been cause for any improvements. Improvements have been made, but those are based on experience with the class.
Perform laboratory or field procedures that explore the content and principles of these disciplines.	field trips and labs: gathered and examined data, assessment of resource use and environmental impacts	92% of students received a C grade or higher for their overall lab grade.	see above
Carry out scientific procedures in a socially responsible manner.	context for scientific analyses throughout class is designed to help students understand human impacts and sustainability	work in class and outside of class	see above
Accurately observe, record, analyze, and report data collected in the scientific laboratory or the field.	See #2 above.	see #2 above	see above

Additional evidence that the general core learning outcomes are being met:The syllabus is being followed. It is more useful to view details of how CORE is met by examining the details in the syllabus.

**Core Assessment Matrix (CAM)
TEMPLATE**

UNIVERSITY OF SAN FRANCISCO

Core Area: Science

Spring 2007

(1) Student Learning Outcomes	(2) Measurement of Evidence	(3) Summary Results	(4) Assessment Informed Improvements
Demonstrate understanding of and literacy in the content and principles of a scientific discipline.	Daily reading quizzes, homework, class room participation with clickers, exams, group learning activities	48% of the students received an exam grade of B or higher, 29% of the class received a daily reading quiz of C or higher, 77% of the students received a homework grade of B or higher	Daily reading quizzes helped students to come prepared and on time to class, clicker participation was well received by the students and provided good feedback for the instructor on misconceptions, reading quizzes and clicker will be continued
Perform laboratory or field procedures that explore the content and principles of these disciplines.	Weekly laboratory sessions, laboratory reports, exams	78% of the students received a laboratory grade of A or higher, 48% of the students received an exam grade of B or higher	Laboratories are under constant development and refinement to provide more discovery-based laboratory exercises, some laboratories have been successfully replaced by tutorial or workshop sessions
Carry out scientific procedures in a socially responsible manner.	Weekly laboratory sessions, laboratory reports	78% of the students received a laboratory grade of A or higher	More scope for student initiative in performing experiments has been implemented by providing extra challenge problems rewarded by extra credit points
Accurately observe, record, analyze, and report data collected in the scientific laboratory or the field.	Weekly laboratory sessions, laboratory reports, homework, exams	78% of the students received a laboratory grade of A or higher, 77% of the students received a homework grade of B or higher 48% of the students received an exam grade of B or higher	Laboratories enhance the learning potential and allow students to reach deeper into the material, regular laboratories are being mixed with tutorial and workshop sessions to help students grasp difficult concepts

Additional evidence that the general core learning outcomes are being met:

Learning Outcome	Assessment Procedure(s)	Results of Assessment	Action Plans	Observations
Demonstrate understanding of and literacy in the content and principles of a scientific discipline.	4 MIDTERM EXAMS	AVERAGE SCORE=87.0%		SENIORS, IN GENERAL, ARE CONTINUING PROBLEM DUE TO POOR ATTITUDE AND WORK ETHIC.
Perform laboratory or field procedures that explore the content and principles of these disciplines.	INSTRUCTOR SUPERVISION	SEEMED SATISFACTORY		
Carry out scientific procedures in a socially responsible manner.	INSTRUCTOR SUPERVISION	NO PROBLEMS FOUND		
Accurately observe, record, analyze, and report data collected in the scientific laboratory or the field.	9 LAB WORKSHEETS	AVERAGE SCORE=89.5%		

ADDITIONAL EVIDENCE THAT THE GENERAL CORE LEARNING OUTCOMES ARE BEING MET:

EVIDENCE THAT COURSE SUPPORTED THE MISSION OF THE UNIVERSITY (Offer the “*...knowledge and skills needed to succeed as persons and professionals, and the values and sensitivity necessary to be men and women for others*”):